



CIPET सि.टे.ए.

परीक्षण रिपोर्ट TEST REPORT

को जारी / Issued to :

M/s. Biogreen Biotech,

No. 37, 2nd Cross,

4th Main, Srinidhi Layout,

JP Nagar 8th Phase, Bangalore - 560078.

क्र.सं. / Sl. No. 23560

रिपोर्ट सं. / REPORT NO. : 59853

Pages.....Nos. Part A,B,C & D

दिनांक / Date : 28.01.2020

संदर्भ / Ref. : Dated: 26.02.2019

परीक्षण मानक स्तर के अनुसार परीक्षण रिपोर्ट / TEST REPORT AS PER TEST STANDARD : Refer Part C

भाग - क / PART - A

प्रस्तुत सैपल का विवरण / PARTICULARS OF SAMPLE SUBMITTED

- अ) सैपल का नाम / a) Name of the Sample : Biodegradable & Compostable Bag
-as stated by the party
- आ) सैपल प्राप्त होने की तारीख / b) Date of Receipt of sample : 27.02.2019
- इ) ग्रेड/प्रकार/आकार/वर्ग / c) Grade / variety / type / size / class : Not applicable
- ई) घोषित मूल्य / d) Declared value, If any : Not applicable
- उ) कोड सं. / e) Code No. : Not applicable
- क) बैच सं. एवं निर्माण तारीख / f) Batch No. and Date of Manufacture: Not applicable
- ख) मात्रा / g) Quantity : 1.5 Kg
- ए) पैकिंग की रीति / h) Mode of Packing : Packed in carton pack
- ऐ) मोहर बंद या नहीं / i) Sealed or not : Not Sealed
- ओ) कोई अन्य सूचना / j) Any other information : --

भाग - ख / PART - B

अनुपूरक सूचनाएँ / SUPPLEMENTARY INFORMATION

- अ) सैपलिंग कार्यवाहियों हेतु संदर्भ / a) Reference to sampling procedure : Sampling not done by this lab
- आ) माप करने हेतु लिए गए सहायक दस्तावेज एवं प्राप्त परिणाम : As given in Part C
- ब) Supporting documents for the measurement taken and result derived
- इ) संबंधित कार्य अनुदेशों में निर्धारित के अनुसार परीक्षण रीति से कोई परिवर्तन
- क) Deviation from the test method as prescribed in relevant work instructions, if any : No deviation from the standard

सिपेट : इंस्टिट्यूट ऑफ प्लास्टिक्स
(राज्य एवं लोक संकलन, पाला शाखा)
गिण्टी, चेन्नै - 600 032.
फ़ोन : 91-44-2225 4701-6 फ़ैक्स : 91-44-2225
ई-मेल : chennai@cipet.gov.in वेबसाइट : www.cipet.gov.in



CIPET : INSTITUTE OF PLASTICS TECHNOLOGY
(Ministry of Chemicals & Fertilizers, Govt. of India)
Guindy, Chennai - 600 032.
Tel : 91-44-2225 4701-6 Fax : 91 - 44 - 22254707
E-mail : chennai@cipet.gov.in Website : www.cipet.gov.in

रिपोर्ट सं / REPORT NO. : 59853

परीक्षण रिपोर्ट TEST REPORT

क्र.सं / Sl. No. 23560

दिनांक / Date : 28.01.2020

भाग - ग / PART - C

परीक्षण परिणाम / TEST RESULTS

Test Duration: 28.02.2019 to 28.01.2020

Sl. No.	Property	Standard	Unit	Results obtained	Specified Requirements
1.	Material Identification by FTIR	--	--	Blend of Poly Lactic Acid (PLA) and Poly Butylene Adipate co-terephthalate (PBAT)	--
2.	Disintegration (Dry mass passing through 2mm sieve after 84 days)	ISO-17088 / IS-17088	%	91.2	Greater than 90
3.	Ultimate Aerobic Biodegradation (with reference to 100% degradation of positive reference)	ISO-17088 / IS-17088	%	90.04 (At the end of 117 days)	Greater than 90
4.	Plant Growth study Rice % Seed emergence	ISO-17088 / IS-17088	%	92	Greater than 90

(Contd...)

[Signature]

Authorised Signatory



TEST RESULTS

Report No:

59853

Date:

28.01.2020

Sl. No.	Property	Standard	Unit	Results obtained	Specified Requirements (In India Maximum)*
5.	Heavy metals concentration	ISO-17088 / IS-17088	ppm		
	Arsenic (As)			0.004	20
	Copper (Cu)			3.099	500
	Nickel (Ni)			0.982	100
	Zinc (Zn)			6.687	2500
	Cobalt (Co)			0.616	--
	Chromium (Cr)			1.433	300
	Molybdenum (Mo)			1.980	--
	Mercury (Hg)			BDL (DL: 0.0005)	10
	Cadmium (Cd)			0.002	20
	Lead (Pb)			0.328	500
	Selenium (Se)			0.016	--

Note: BDL – Below Detection Limit, DL – Detection Limit

*-Based on Municipal waste (Management and Handling) Rules, 1999 notified on 27th September, 1999 by Ministry of Environment and Forests, Government of India. Note that concentration of metals like cobalt, molybdenum and selenium is not mentioned in the notification.

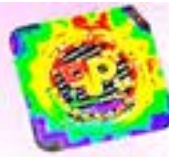
PART - D

REMARKS - Nil

NOTE:

1. The results related only to the items tested as supplied by the party.
2. The test certificate shall not be reproduced in full except without the written approval of the laboratory.


AUTHORISED SIGNATORY



TR. No. 59853

BIODEGRADABILITY TEST AS PER IS/ISO 17088

1. Sample detail: (as declared by the party): Biodegradable & Compostable bag

2. Material Identification by FTIR: Blend of Poly Lactic Acid (PLA) & Poly Butylene Adipate Co Terephthalate (PBAT)

3. Observation

(1) Conditions of reaction mixtures

Origin of compost: Livestock excrement, municipal and vegetable waste

Reaction Temperature : 58°C ($\pm 2^\circ\text{C}$)

Dry Solid (%) : 61.2

Volatile content (%) : 39.5

CO₂ evolved during first 10days in blank vessels: 64.1 mg/g of volatile content of compost

Test duration (day) : 117 days

Reference material : Cellulose

Volume of reaction vessel : 3000 ml

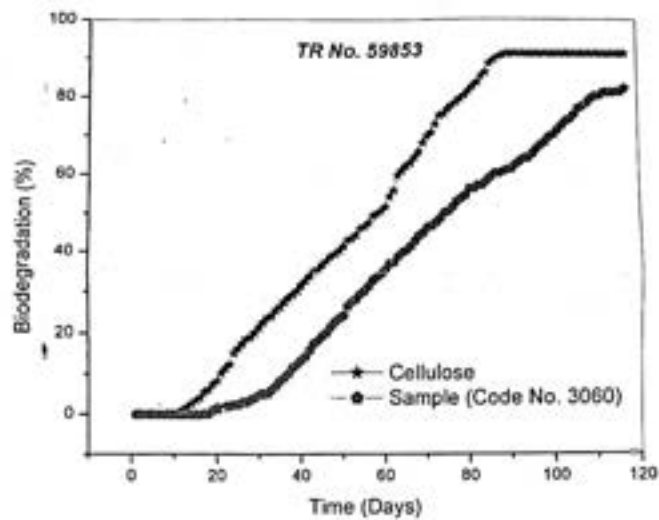
(2) pH of test medium

S.No.	Composting Vessel (Material with test medium)	pH (before)	pH (after)
1	Sample 1	7.6	7.3
2	Sample 2	7.5	7.3
3	Sample 3	7.5	7.4
4	Blank	7.6	7.5
5	Cellulose 1	7.6	7.3
6	Cellulose 2	7.6	7.2
7	Cellulose 3	7.5	7.3
8	Negative	7.6	7.2

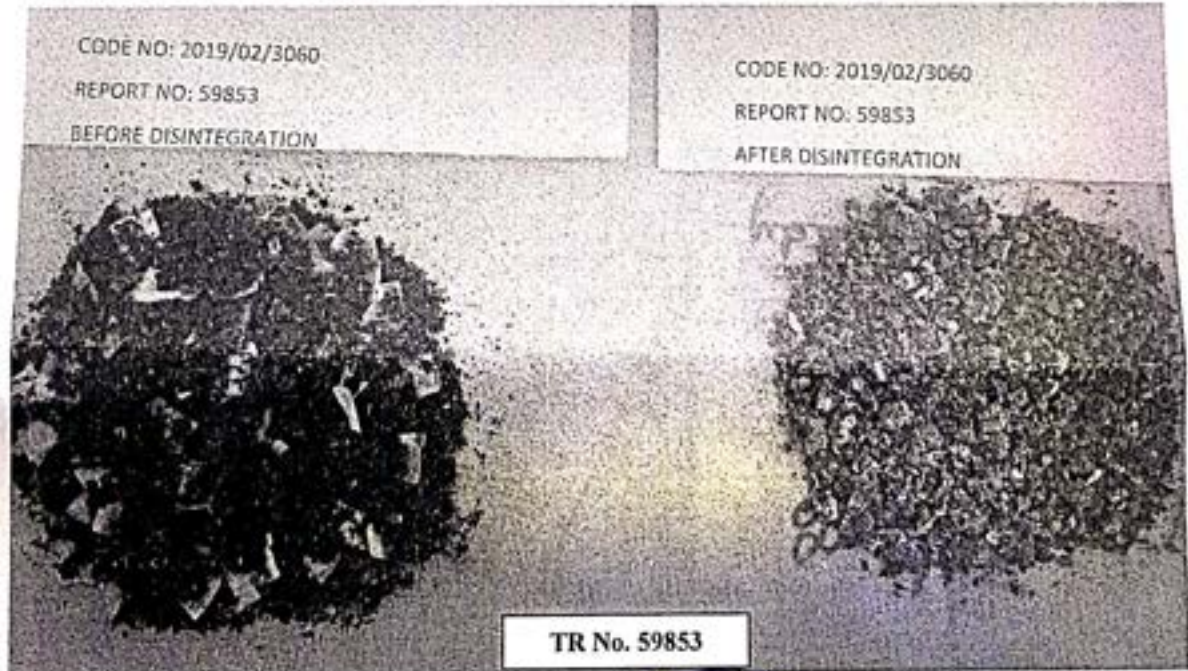




4. Result: Percentage biodegradation relative to positive reference
Sample : 90.04%
Positive reference cellulose : ~ 100 %



5. Disintegration- After 12 weeks





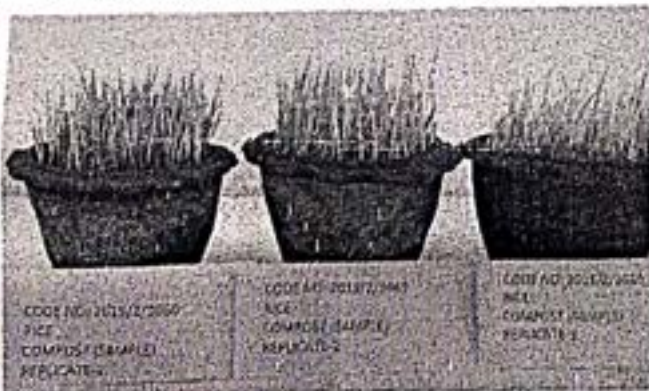
6. Visual Observation

Description	Week 1/2	Week 3/4	Week 5/6	Week 7/8
Structure	Fine Particles	Fine Particles	Fine Particles	Fine Particles
Moisture	Adequate moisture Level	Adequate moisture Level	Adequate moisture Level	Adequate moisture Level
Colour	Dark brown	Dark brown	Dark brown	Dark brown
Fungal Development	Nil	Nil	Nil	Nil
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

Description	Week 9/10	Week 11/12	Week 13/14	Week 15/16
Structure	Fine Particles	Fine Particles	Fine Particles	Fine Particles
Moisture	Adequate moisture Level	Adequate moisture Level	Adequate moisture Level	Adequate moisture Level
Colour	Dark brown	Dark brown	Dark brown	Dark brown
Fungal Development	Nil	Nil	Nil	Nil
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

7. Plant Growth Study

Paddy growth in sample degraded compost



Paddy growth in control compost



Authorized Signatory

Page 3 of 3